# Lesson 9 – Random Numbers and Encryption

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * Encryption is everywhere and it is used to keep data safe and secure, especially during Internet based exchanges and transactions. Random numbers are used as part of the encryption process and Learners will learn how to build and program an encryption device. | * Know what a random number is * Use the random module with the micro:bit to code a random number generator * Know the difference between random and true random numbers * Be aware of encryption and its uses * Program an encryption device |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * Play the ‘Guess my number’ game at the start * Show example of encryption in films or TV programs * Discuss news stories involving encryption / lack of encryption and the consequences. * The encryption activity can be run as a spy game where Learners have to solve the secret message. | **Expected Progress:**   * Learners create a random selection program * Learners use a list   **Good Progress:**   * Learners build an encryption program * Learners use the program to create a message   **Exceptional Progress:**   * Learners assign the micro:bit buttons to two encryption programs |
| Links to KS3 Programme of Study | |
| * understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns * use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions | |
| Key Concepts | Key Words |
| * Random and true random * Encryption and its uses * Programming random number / word selection * Creating a simple encryption device. | * Random * True random * Modules * Lists * Encryption * Algorithm |
| Differentiation | Resources |
| Most Learners will be able to follow the instructions  However, teacher support for the Learners using two encryption programs to select the content for the message may be required. | * Lesson 9 ppt * Lesson 9 Activity Sheet * Sample Python code * 1 micro:bit per learner * 1 USB cable to connect the micro:bit to a PC * A PC * Access to [micro:bit Python Editor (microbit.org)](https://python.microbit.org/v/3) |
| Lesson Flow | |
| * Learners / teachers play ‘can you guess my number’ in less than five guesses * Teacher introduces the concept of randomness, what is it? * Show code and discuss the use of the random moduleand the list * Class discussion on random and true random numbers * Activity one - Learners code a simple random selection program * Teacher / class discussion about encryption and its uses * Activity two - Learners program and build their encryption device * Teacher intervenes where appropriate * Ask Learners swap and solve the encrypted messages * Recap key points from lesson | |
| Making | |
| There are no making activities in this lesson. | |